Evaluation of error estimates of aerosol properties retrieved from remote sensing by the GRASP algorithm

Milagros E. Herrera[a,b,*], Oleg Dubovik[a] , Tatyana Lapyonok[a], Anton Lopatin[c], Benjamin Torres[a], Juan L. Bali[d,e], and Pablo R. Ristori[b]

[a]*Laboratoire d'Optique Atmospherique, 59655 Villenueve d'Ascq, France*
[b]*CEILAP-UNIDEF (MINDEF-CONICET)–CITEDEF, (B1603ALO) Villa Martelli, Prov. de Buenos Aires, Argentina*
[c]*GRASP-SAS, 59655 Villeneuve d'Ascq, France*
[d]*Crisis Modelling and Management Department – CITEDEF, (B1603ALO) Villa Martelli, Buenos Aires, Argentina*
[e]*National Scientific and Technical Research Council – CONICET, (C1425FQB) Ciudad Autonoma de Buenos Aires, Argentina*

[*]*Presenting author (milagros.herrera@univ-lille.fr)*

The generation of the reliable error estimates for retrieval products is a very important and, at the same time, very challenging task in the development of the for aerosol remote sensing methodologies. Here we discuss the generation of the error estimates in frame of GRASP (Generalized Retrieval of Aerosol and Surface Properties) algorithm [1,2]. GRASP is an inversion algorithm based on the concept of statistically optimization fitting designed for retrieval detailed aerosol properties from diverse observations [2]. The methodology of error estimating will be described and illustrated on application of GRASP algorithm to aerosol retrieval from ground-based observations. The error budget analysis for such application have been already analyzed extensively in previous studies [3,4] by taking into account the effects of diverse random and systematic uncertainties. In this study we complete above investigation by in depth analysis of the structures of full covariance matrices if the retrieval properties. We identify important correlations of optical measurements sensitivities to the variability of different aerosol parameters and outline main tendencies in the retrieval errors dynamics related with changes in measurements configuration and in observed atmospheric conditions. Specifically, based on the identified tendencies we will illustrate the potential and limitations in characterizing complex aerosol mixtures composed by aerosol components with different microphysical and optical properties.

References

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Preferred mode of presentation: Oral/Poster